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María Gómez León

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Keywords: Middle class, inequality, polarisation, Brazil.

JEL Classification: D31; D63; N16; N36; O15.

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The Rise of the Middle Class,

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1. Introduction

The rise of middle class during process of economic development has become a major research topic in the recent literature (Birdsall, 2010; Ravallion, 2010; Solimano, 2008). Members of the middle class are presented as indispensable for economic and social development, as they represent an important source of demand, production, investment and modernisation as well as a strong political voice demanding institutional reforms (Banerjee & Duflo, 2008; Easterly, 2001). Additionally, interest in the topic has been fuelled by the significant expansion of this social group in Latin America during the last decade (Ferreira, et al., 2013: 1). In particular, the Brazilian case has attracted a great deal of attention due to the country's recent economic growth accompanied by decreasing inequality, the reduction of absolute poverty and the rise of the middle class (Côrtes Neri, 2010: 31). Between 2001 and 2010, GDP per head recorded an average annual growth of 2.4 per cent (IBGE, 2011). Meanwhile, from 2002 to 2012, 35 million (previously poor) people in Brazil entered the middle class, enlarging the size of this class from 38 per cent of the population in 2002 to 53 per cent in 2012 (SAE, 2012: 7). However, this is not the first time that Brazil has experienced such rapid economic growth. Table 1 shows that comparable episodes of rapid economic growth took place in Brazil between the mid-nineteenth and the mid-twentieth century (Goldsmith, 1986), due mainly to the coffee export boom and subsequent development of transport and local industry (Furtado, 1965: 11; Goldsmith, 1986: 137; Leff, 1982: 62). For example, GDP grew 5.3 per cent annually between 1921 and 1929, fuelled by the agriculture and commerce sectors which accounted respectively for 37.8 per cent and 26 per cent of GDP, while industry and

transport grew more rapidly during the period (5.3 per cent and 10.7 per cent respectively).[1] Yet, little is known about the evolution of inequality and the presence of the Brazilian middle class over longer periods of time, as most studies have only focused on relatively short and recent periods (Côrtes Neri, 2010; Cruces, López-Calva, & Battistón, 2011; López-Calva & Ortiz-Juárez, 2011).

Table 1. Brazil's main economic statistics according to Goldsmith, 1851-1955

	GDP growth (%)		Main sectors growth (%)				Average sectorial contribution to GDP (%)				
Period	Agregate	Per head	Agric.	Indus.	Com.	Trans.	Agric.	Indus.	Com.	Trans.	State
1851-1889	2.0	0.3	n.a	n.a	n.a	n.a	56.6	12	19.5	3.3	8.5
1890-1913	3.0	0.7	n.a	n.a	n.a	n.a	41.5	17.8	24.3	5.7	10.7
1914-1920	3.9	1.8	n.a	n.a	n.a	n.a	41.3	20.1	24.9	6.8	6.9
1921-1929	5.3	3.2	4.0	5.3	4.7	10.7	37.8	20	26.1	8.3	7.8
1930-1945	3.9	1.7	1.9	6.5	3.8	4.5	32.7	24.7	25.7	8.2	8.8
1946-1955	6.8	3.9	3.6	9.3	6.9	9.8	31.7	30.8	20.6	8	8.9

Sources: Goldsmith (1986: 8-11, Tab. I-5, I-6 and I-7).

This article aims to explore the evolution of inequality and the presence of Brazil's middle class between the mid-nineteenth and the mid-twentieth century. Particularly, it addresses the following questions: (1) When and how did the middle class emerge in Brazil? and (2) Was there any connection between the emergence of the middle class and inequality performance?. In answering these questions, the article contributes to the debate on whether Brazil suffered from persistent inequality from its colonial era until recent times or whether inequalities arose at a different time (Acemoglu, Johnson, & Robinson, 2002; Bértola, et al., 2012; Engerman & Sokoloff, 1997; Prados de la Escosura, 2007a; Williamson, 2015). The article contributes by proposing a quantifiable definition of the middle class: the MCI. Moreover, it offers new

[1] While Table 1 does not offer estimations of State sector growth, there is evidence that it grew considerably. For example, Owensby (1999: 27) pointed out that between 1872 and 1920 the federal budget for civil administration doubled while the number of civil servants quadrupled.

insights on the relationship between inequality, the reduction of absolute poverty and the rise of the middle class.

The paper's main findings can be summarised as follows. Principally, the paper shows that Brazil's inequality is not endemic and that the idea of a middle social group (different from the wealthy landowners and the servile class) existing between the mid-nineteenth and mid-twentieth centuries is not remote. During the nineteenth century Brazil exhibited low inequality values linked to low income levels, which, in turn, impeded the rise of its middle class. Then, from the early twentieth century the process of economic growth, accompanied by increasing inequality, went hand in hand with the emergence of the middle class. Yet, in the following decades, despite rapid economic growth, the continued increase of inequality, especially from the Vargas Era, inhibited the consolidation of the middle class and the eradication of poverty.

The article proceeds as follows: Section 2 offers a short discussion on Brazil's inequality from 1839 and 1950; I then analyse Brazil's income distribution during this period from a polarisation approach and introduce the new MCI based on polarisation measures (Section 3).[2] I show the sources I used for the MCI estimation in Section 4, and analyse the performance of the middle class between 1839 and 1950 in terms of income (Section 5) and in terms of status (Section 6). Finally, Section 7 concludes.

[2] The choice of 1839 as the beginning of the period responds to the interest in investigating Brazil's income distribution from the earlier available year right after Brazil's independence (in 1822).

2. A glance at inequality challenging the over-pessimistic

Studies on economic development have been usually worried about the connection between persistent inequality and poverty (Birdsall & Londoño, 1997; Bourguignon, 2000; Ravallion, 2001). Yet little has been said about the relationship between inequality and a key factor to achieve economic and social development: the rise of the middle class. Tentatively, by looking at inequality performance one might obtain some intuitions on the middle class emergence and evolution. In particular, quantitative works using the Gini index might be especially useful for this purpose, as the Gini index has the characteristic of being particularly sensitive to transfers in the central part of the distribution.

In this regard, the examination of the literature on Brazil's historical inequality highlights two different stories: a pessimistic one, in which persistent high inequality in Brazil would have made unlikely the existence of any social group different from the wealthy landowners and a poor servile class; and a more optimistic one, in which the existence of inequality would not have been endemic and the presence of different social groups not so improbable.

In the negative view, inequality would be rooted in Brazilian colonial history. Engerman and Sokoloff (1997) argued that the roots of Latin America inequality are located in the natural resource endowments that fostered the development of extractive institutions, which, in turn, undermined growth. Acemoglu, Johnson and Robinson (2002), while also pointing at the presence of extractive institutions as the main reason for persistent inequality in Latin America, held, however, that extractive institutions originated due to the abundant population density and affluence. According to this view,

quantitative estimations from Bértola et al., (2012) suggest that inequality was already high by 1870, with a Gini coefficient higher than 0.5 that continued increasing during the first globalisation boom.

From a more optimistic perspective, quantitative explorations by Prados de la Escosura (2007a), Milanovic, Lindert, and Williamson (2010) –MLW hereafter-, and Williamson (2010) suggest that Brazil's inequality persistence is a "myth" as inequality did not begin to rise until a decade or two before the start of the belle époque (1870-1914) (Williamson, 2010; 2015) or even later, from 1913 onwards according to Gini coefficients below 0.5 (Prados de la Escosura, 2007a). To these authors low inequality values resulted from low levels of income per head.

The findings of this article tend to agree with this hypothesis of low inequality levels associated with low income values, with estimated Gini coefficients ranging between 0.2 and 0.35. Indeed, as can be seen in **Figure 1**, my estimates are very close to those reported by Prados de la Escosura (2007a) even though we use independent sources.[3] Both show a long-run decline in inequality until 1913, which was interrupted by a flat phase between the 1870s and the 1890s according to Prados de la Escosura's (2007a) estimates, or by a short-lived increase from 1860s to 1870s according to my estimates. However, both estimates then report a sharp increase in inequality from 1913 onwards.

[3] Prados de la Escosura (2007a) calculated Pseudo-Ginis by backcasting actual Gini estimates with the ratio between real GDP per worker and unskilled real wage rates, expressed in index. He relies on Williamson's ([1995] 1996) real wages for the case of Brazil, whereas my Gini estimations come from own calculations based on the sources presented in Section 4.

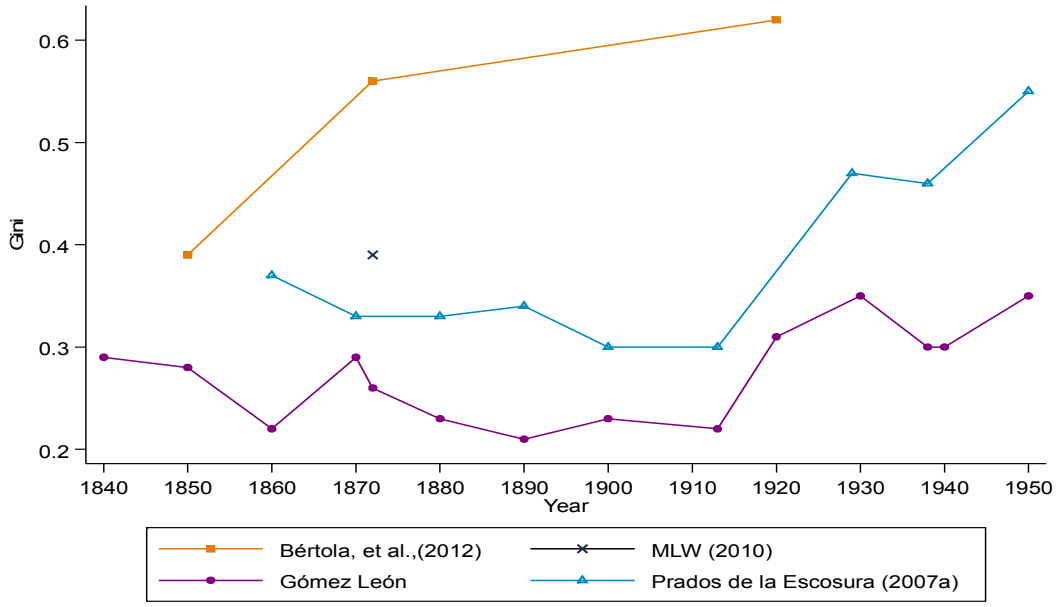

Figure 1. Brazil's inequality: Gini coefficients
Sources: Prados de la Escosura (2007a: 296, Tab.12.1); MLW (2010: 63, Tab.2) and Bértola et al. (2012: 12, Tab.6). Own estimates are detailed in Section 4.

At this point, I would like to introduce Milanovic's approach as a way to test how plausible these estimates are. This author claims that when: "there is a society with an average income just slightly above the subsistence minimum. If all members of the society are to survive, then the surplus [the extraction ratio], even if it is appropriated by a tiny group of people, cannot be large, and the Gini coefficient must be relatively low" (Milanovic 2006: 466-67).

He further argued for the existence of a maximum attainable inequality (which is an increasing function of mean overall income) which can be estimated and represented by the Inequality Possibility Frontier (IPF henceforth).[4] Then, let's place the different estimates within the proposed IPF, based on GDP per head (in 1990$PPP) from Maddison (2003).

[4] These concepts are also used in MLW (2007; 2010); and Milanovic (2006; 2009; 2011).

Figure 2 shows Brazil's IPF, with a proposed maximum Gini ranging between 0.3 and 0.6.[5] Own estimates, in accordance with the more optimistic outlook, remained below the frontier, starting from 0.2 at the beginning of the period and growing later from 1913 once GDP per head had begun to increase.[6] Meanwhile, pessimistic estimates, such as those reported by Bértola et al., (2012) surpass the frontier suggesting that "such a society [would be] doomed to a dwindling population and ultimately extinction" (Milanovic, 2009: 9). It is worth noting that low Gini values do not necessarily signify an egalitarian society (in fact, they might conceal a bipolarised society), but one in which the elite was very small because the surplus available for extraction was low.

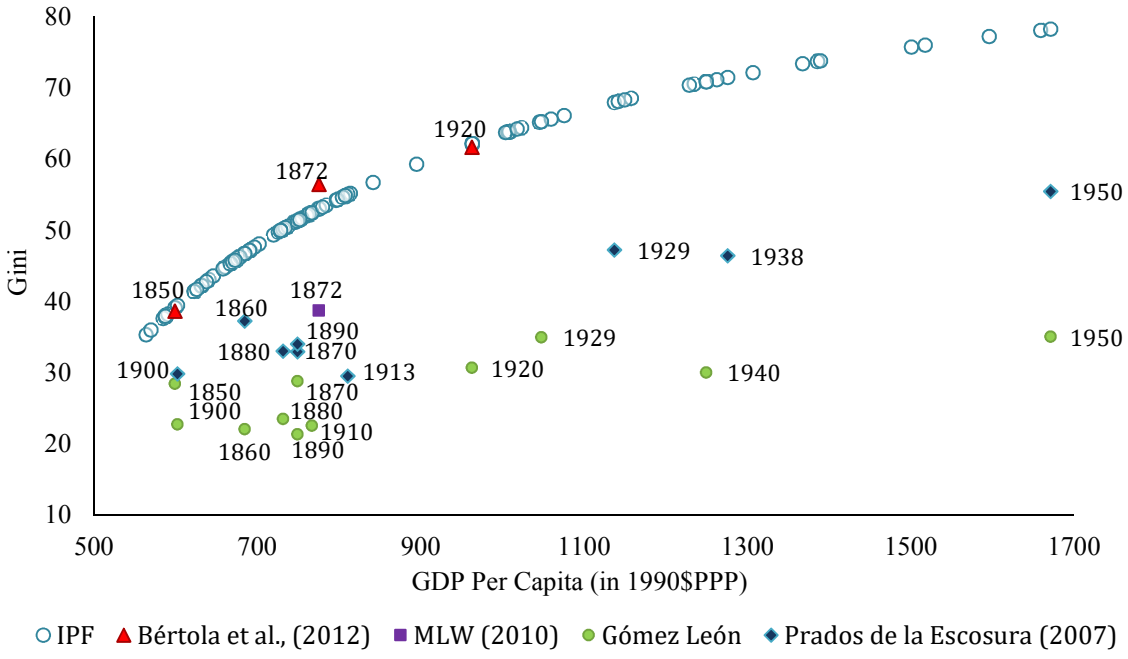

Figure 2. Brazil's IPF (1850-1950)
Sources: Prados de la Escosura (2007a: 296, Tab.12.1); MLW (2010: 63, Tab.2); and Bértola et al. (2012: 12, Tab.6). Own estimates are detailed in Section 4. Estimates of GDP per head (in 1990$PPP) are based on Goldsmith (1986) and Maddison (2003).

[5] In this case, the maximum feasible Gini has been calculated considering a subsistence level of 365$, that means a poverty line of 1$ per day.
[6] In Figure 2, Gini coefficients are expressed in percentages instead of values. Therefore a Gini of 0.2 in the text above stands for a Gini of 20 in the Figure.

Actually Figure 3 shows that my estimates imply an extraction ratio between 50 and 70 per cent. Meanwhile, Bértola's estimates imply an extraction ratio oscillating between 99 and 110 per cent. If we come back to Milanovic's (2011: 502) argument: "in the medium term, extraction ratios above 100 per cent are possible only if population decreases", while there is evidence that Brazil's population increased over this period.[7]

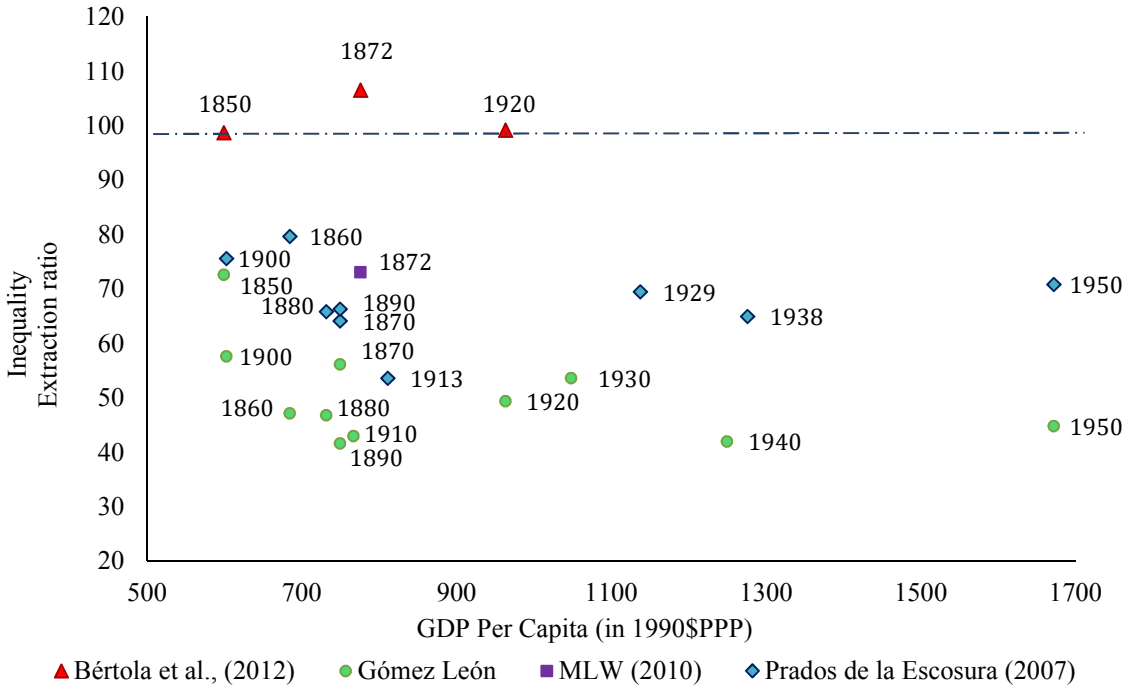

Figure 3. Brazil's inequality extraction ratio (1850-1950)
Sources: Same as Figure 2

Additionally, estimations of Brazil's historical IPF and *Extraction Ratio* (Figures 4 and 5) indicate that, despite periods of high GDP per head, Gini coefficients have remained quite below its maximum attainable inequality and that the Extraction Ratio has never surpassed 80 per cent. In this vein, Milanovic (2011: 502) observed that the average extraction ratio estimated in MLW (2010) over thirty societies (from the Imperial

[7] Total population grew from around 4 million in 1822 to 51 million in 1950 (IBGE, 1990).

Rome in year 14 to Siam and Kenya in 1927) did not surpass 75 per cent. Therefore, low inequality values in Brazil over the nineteenth century seem plausible given low income levels. Indeed these inequality values implied extraction ratios close to 70 per cent, far from negligible at both national and cross-national levels.

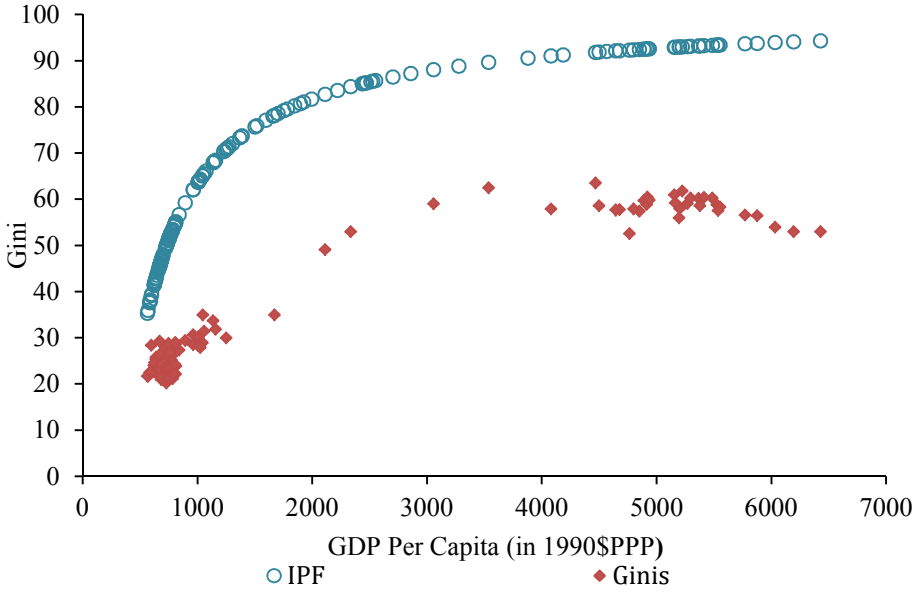

Figure 4. Brazil's IPF (1850-2008)
Sources: Until 1950 Gini own estimates are detailed in Section 4; From 1950 Gini values come from UNU-WIDER World Income Inequality Database (WIID). Estimates of GDP per head (in 1990$PPP) are based on Goldsmith (1986) and Maddison (2003).

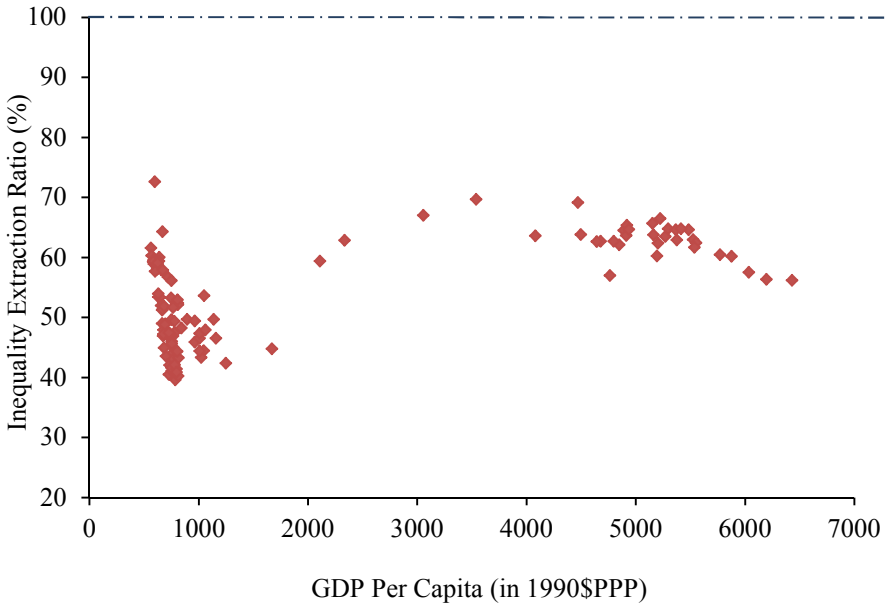

Figure 5. Brazil's Inequality Extraction Ratio (1850-2008)
Sources: Same as Figure 4.

To sum up, inequality trends might be interpreted as supportive of the presence of a middle class over the period 1850-1950, especially up to 1913 (when Gini coefficients were falling) with a reversal thereafter. The alternative interpretation could be, however, that low inequality values in the nineteenth century, pointing to low income levels, might have prevented the emergence of the middle class. Yet, the opposite could have happened during the twentieth century, when high inequality values could be linked to an early phase of economic growth in a Kuznetsian sense (i.e. to the transitional process from the traditional sector to a modern one), allowing for the appearance of different social groups. Therefore, inferences on the middle class' performance based on inequality measures are far from being conclusive, and thus a complementary analysis must be applied.

3. Defining the middle class through polarisation measures

An alternative to study and clarify the presence of the middle class is to examine the income distribution from a polarisation approach. The key idea behind this method is that, contrary to inequality, polarization measures control for the existence of specific social groups, such as the middle class. This is because while inequality measures (such as Gini) estimate the extent of concentration of the population around the mean income of the distribution, polarisation measures test the formation of different groups of income along this distribution. Therefore, whereas with inequality measures distributions follow unimodal shapes, polarisation measures lead to distributions with bimodal (or multimodal) shapes which allow the clear discernment of the absence (or presence) of a middle class (Gradín & del Río, 2001: 4). In this sense, from a polarisation perspective,

the extreme situation arises when the population is equally distributed between two distant poles (bipolarised distributions), highlighting the absence of a middle class.[8]

Following this reasoning, Foster and Wolfson (2010) examined the lack of the middle class by developing a bipolarisation index (hereafter FW index). This index assumed the existence of two equally sized groups whose cut-off is the median income.[9] Therefore, for these authors, the increase in the FW index (i.e. the increase in bipolarization) indicated the disappearance of the middle class, while the fall of the index suggested the contrary: the rise of the middle class.

Later on, this idea was subsequently taken to the next level by Cruces, López-Calva and Battistón (2011) in their study of the Latin American middle class. These authors started from a tripolarisation situation; that is, assuming the existence of three income groups. Hence, for these authors it was the increase of the tripolarisation indicator that indicated the rise of the middle class. In this case, since they assumed the existence of three income groups from the beginning, they calculated tripolarisation by using the polarisation index developed by Esteban Gradín and Ray (2007) (EGR index hereafter) which, contrary to the FW index, allows for the existence of *n* different sized groups.

Following this reasoning, (Foster & Wolfson, 2010; Cruces, López-Calva, & Battistón, 2011), it is crucial to understand that decreasing bipolarisation together with increasing tripolarisation clearly point to the emergence of a middle class. Therefore, a step further with regard to the definition of the middle class would be introducing a new

[8] From an inequality perspective instead, a situation of extremity would be reached when one person receives all the income and the rest receives nothing (distribution with a long right tail).
[9] This polarisation index is derived from the Lorenz curve and it can be defined as: twice the area of the region between the Lorenz curve and the tangent line. For further details see Foster & Wolfson (2010).

middle index (MCI), which is defined as the ratio between tripolarisation and bipolarisation.

The rationale behind this definition is that the separate analysis of bipolarisation and tripolarisation might lead to inaccurate conclusions when they move alongside each other. For example, Figure 6 shows the evolution of both tripolarisation and bipolarisation in Brazil between 1839 and 1950. As can be observed, throughout the nineteenth century both indicators moved together making it difficult to conclude when the middle class arose. For instance, when looking at bi-polarisation trends one could place the emergence of the middle class in the early nineteenth century, when bi-polarisation was falling. Tri-polarisation, however, was falling too. Similarly, in terms of tri-polarisation, one could place the rise of the middle class in the 1860s, when tri-polarisation increased. Yet so did bipolarisation. Meanwhile, if one analyses both indicators together, it can be presumed that increases in tri-polarisation along with decreases in bi-polarisation are what undoubtedly should be indicating the emergence of a middle class.

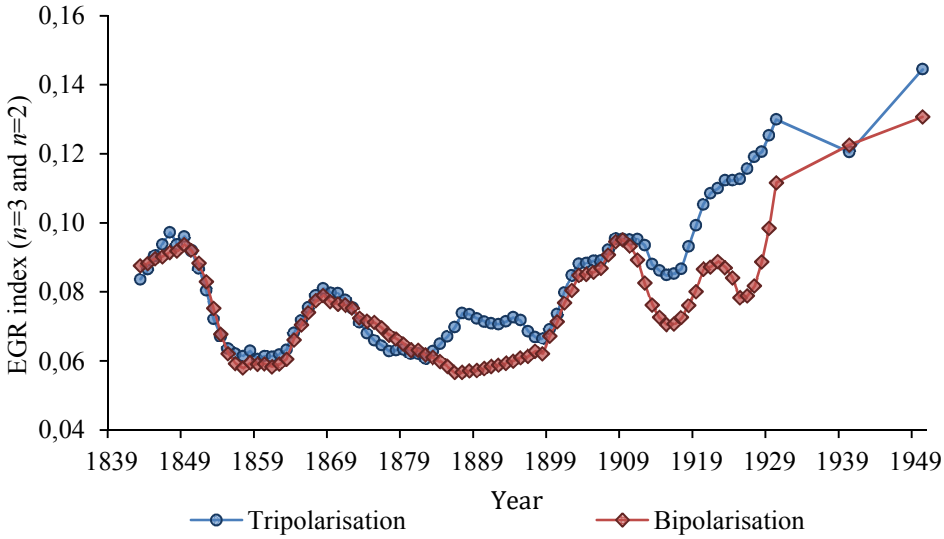

Figure 6. Brazil 1839-1950: Bipolarisation (EGR, *n*=2) and Tripolarisation (EGR, *n*=3), 5-year moving averages.
Sources: From 1839 to 1930 based on Bértola et al., (2007), Monasterio (n.d), DGE (1872, 1926) and Lobo (1978: 803-20); for 1940 and 1950 sources are IBGE (1990) and DGE (1950, 1956).

At this point, it might be argued that merely examining tripolarisation and testing the size of the middle income group would provide enough evidence of the presence of the middle class. However, just looking at the size of the middle income group can lead to incorrect conclusions when this group is actually very similar to the poorer one in terms of income. For instance, Milanovic (2009: 7) argued that: "in preindustrial societies the middle [in terms of income] was not much different from the bottom". Therefore, in order to avoid incorrect inferences when reporting the presence of a middle class, it is crucial to consider those situations in which the phenomenon tripolarisation surpasses bipolarization, meaning that there is a middle income group homogeneous inside and different from the other two.[10]

Importantly, the proposed new MCI, defined as the ratio between tripolarisation and bipolarization, permits one to capture this phenomenon. When tripolarisation overcomes bipolarization, the MCI will be above one, reporting the presence of a middle class. Meanwhile when bipolarisation is equal or higher than tripolarisation, the MCI will be equal or below one, suggesting the opposite: the lack of a middle class.

Finally, since the purpose of this article is to find as much accurate definition as possible of the Brazilian middle class, I will address two dimensions of the middle class: income and status. Hence, I will construct two MCIs: one based on polarisation measures in terms of income, and the other based on polarisation measures in terms of status. Both

[10] Note that tripolarisarion is a particular case of bipolarisation, which arises when one of the two groups (the high or the low) has become heterogeneous inside (in terms of income) giving rise to the emergence of a new middle income group. In the same vein, bipolarisation is a particular case of tripolarisation, which increases when two of the three groups have merged because both have become similar in terms of income.

exercises are explained in the following sub-sections and empirically tested in Sections 5 and 6.

3.1 Defining middle class in terms of income

First, in order to define the middle class in terms of income, I calculate the MCI using the EGR polarization measure. The choice of the EGR measure derives from the fact that it allows for the estimation of polarization for *n* groups. In addition, the EGR avoids arbitrariness in the definition of groups, as the cut-offs are set endogenously. For a better understanding of this, in what follows, I explain the main characteristics of this index.

The EGR index consists of a general polarisation measure with four characteristics: (1) a high degree of homogeneity within each group; (2) a high degree of heterogeneity between groups; (3) a small number of significant sized groups, meaning that very small groups (such as isolated individuals) have little weight; and (4) the higher the number of selected groups, the lower the polarisation.

In particular, this index is based on a model of individual perceptions according to two factors: the *identification* factor and the *alienation* factor. The *identification* factor refers to how the individual feels in respect to other individuals, considered to be members of this group in terms of income. The *alienation* factor captures how an individual feels with respect to the rest of individuals that belong to other groups. The joining of both factors composes the *effective antagonism feeling* of each individual. Finally, the aggregation of the *effective antagonism feelings* of all members in society

conforms their polarisation measure [1]. Additionally, the authors included to this measure an error term which captures the extent of dispersion within groups [2].[11]

$$ER\ index = \sum_{i=1}^{n} \sum_{j=1}^{n} p_i^{1+\alpha} p_j |y_i - y_j| \text{ [1]}$$

$$ERG\ index = ER(\alpha, \rho) - \beta\varepsilon(f; \rho) \text{ [2]}$$

where: p_i is the population share in the group *i,* y_i is the income of the population in group *i* (expressed in logarithms), and α is a parameter that captures the sensitivity to polarisation (a higher α reflects more sensitivity to the group's concentration). These authors set α between 1, 1.3 and 1.6 (α ϵ [1, 1.3 and 1.6]) in order to satisfy the above four axioms. In this article the intermediate value of α=1.3 will be applied.[12] Finally, the error term (or lack of identification) is pondered by the free parameter β.[13]

Importantly, the inclusion of the error term implies that, for a fixed number of groups, the ERG index takes the optimum position of each group, minimizing the internal heterogeneity error. Consequently the cut-offs between groups are set endogenously, although the election of the number of groups still depends on the investigator criteria. This is important, because this index allows one to choose the number of groups needed to compute tripolarisation (*n*=3) and bipolarisation (*n*=2). Additionally it also gives the guarantee that the definition of each group will be optimum and non-arbitrary. To sum up, the methodology I will use to estimate the middle class in terms of income will consist of estimating the EGR indicator for the cases *n*=3 (tripolarisation) and *n*=2 (bipolarization), then calculating the ratio between both to obtain the MCI.

[11] In fact, the equation [1] is the first earlier version of the index (before the error term was included in the formula). This earlier version was named as ER index and it was developed by Esteban and Ray (1994).

[12] If α=0, the results will be very similar to those obtained from the Gini index. I tested that the choice of different α's does not change the results on polarisation trends, and changes in levels shows to be very small. For a further discussion on this issue see Esteban and Ray (1994: 834).

[13] The β term is the weight assigned to the error in the representation of the density function. Please, note that if β=0 is the particular case of ER index.

3.2 Defining middle class in terms of status

In order to define the middle class in term of status, it is necessary to apply a polarization measure based on characteristics; this is a measure that permits to set groups according to any attribute, in this case the status. In particular, I calculate the MCI in terms of status using the polarization indicator in terms of characteristics developed by Zhang and Kanbur (2001) (ZK index hereafter).

The ZK index is an indicator based on the inequalities within and between groups, derivatives from Theil's (1979) generalized entropy index, according to some characteristic (such as gender, education, ethnicity, etc.). In other words, this indicator analyses the distance among groups linked to differences within groups, according to any attribute (for example the status). In this sense, the more homogenous the groups are (meaning less inequality within groups), the bigger the differences existing between groups will be (that is, more inequality between groups) and the bigger the polarisation. Therefore the ZK polarisation index is defined as the ratio between GE[0] between and GE[0] within, which respectively capture the inequality between groups and the inequality within groups according to the general entropy inequality index.[14]

In this article, when using the ZK index, the *alienation factor (*what determines differences across groups) will be income, while the *identification factor* (what determines homogeneity within the group) will be status. In this vein, it should be noted that while with the EGR the groups were set endogenously, with the ZK index the groups must be previously defined according to specific characteristics (in this case, the status). In the same vein, it is also worth noting that, contrary to the EGR (2007) index, in the ZK

[14] For a review of how the generalized entropy index is constructed see Theil (1979)

(2001) index the size of groups remains fixed. Thus, given a fixed active population structure, it is the case that tripolarisation is always higher than bipolarisation, so presumably the MCI in terms of status will be always above one. Yet, the evolution of the middle class in terms of status still can be assessed by looking at the r evolution of the ratio between tripolarisation and bipolarisation.

Notably, while it can be argued that the prior definition of groups implies a certain level of arbitrariness, the differentiation of groups in terms of characteristics is not as controversial as it can be in terms of income. For example, there is evidence that in Brazil's nineteenth and twentieth centuries some characteristics such as being a cultivated person or having a non-manual job, identified people with the middle class status more than their incomes did (Owensby, 1999). Therefore, in this case, I form the groups according to the social status linked to the profession.

The criteria when assigning a particular status to the different professional categories is based on the Historical International Social Class Scheme (HISCLASS hereafter) classification, which is linked, in turn, to the Historical International Standard Classification of Occupations (HISCO hereafter) classification. The link between the HISCLASS and HISCO classification is established according to the skill level of each profession (high, medium or low) and its condition (manual or non-manual).[15] While HISCLASS grouped the classified occupations into twelve classes (ranked on a prestige or status scale), I have grouped and ranked them into three different groups (high, middle

[15] See van Leeuwen, et al. (2002) and van Leeuwen and Maas (2011).

and low) and two groups (high and low) which will allow me to fully calculate tripolarisation and bipolarisation, thus the MCI in terms of status.[16]

In summary, to define the Brazilian middle class in terms of status, I calculate the ZK (2001) for the cases n=3 and n=2, then the ratio between these two to obtain the MCI in terms of status. In this case, arbitrariness when defining groups is not just ineluctable but also necessary, as the groups need to be previously distinguished according to professional status.

4. Data analysis

The first household survey developed in Brazil dates from 1967, making this approach unpractical for the historical purpose of this article. Therefore, to explore Brazil's income distribution, I have recurred to the construction of a social table with information on the structure of active population (by profession) and associated real income, distinguishing by gender (male, female), condition (free, slave) and area (urban, rural).

First, to obtain data on active population by profession I turned into national censuses. In Brazil the first national census corresponds to 1872 and the subsequent censuses were conducted in 1920, 1940 and 1950 (DGE-Diretoria Geral de Estatística, 1872; 1926; 1950; 1956). Since there is not an annual series on active population data, I apply the fixed structure of the active population provided in the censuses to my income time series (Bértola et al., 2007).[17] From 1839 to 1898 I use the census of 1872; from

[16] See Appendix Table 1.

[17] While interpolation methods could have been applied from 1870 to 1950 to the data on total population, lack of data from 1839 to 1870 did not allow me to maintain a uniform criterion. Therefore, I decided to maintain the same methodology for my whole period, using the fixed active population provided in the census benchmark years.

1899 to 1930 the 1920 census; and for 1940 and 1950 the censuses developed for these single years. Secondly, the data for the income time series for each professional category is taken from the censuses (DGE 1872, 1926, 1950, 1956), but also from historical statistics (IBGE 1990) and official information on yearly nominal wages provided by Lobo (1978).[18] Moreover, Lobo's dataset has been complemented with additional information of yearly incomes of landowners and slaves.[19]

I have paid attention to the fact that from 1839 to 1898 most income information belongs to Rio de Janeiro and other regions of South-Eastern Brazil. Hence, the time series of active population (by profession) has been constructed using information on the active population (provided by the 1872 census) present in the South-Eastern Brazil (Espírito Santo, Minas Gerais, Municipio Neutro, Rio de Janeiro and São Paulo). Yet there are some good grounds to believe that the sample is representative as in 1920 more than half of the urban population resided in Rio de Janeiro and in São Paulo (Fausto, 1989: 234). Moreover, almost 75 per cent of total GDP was concentrated in the South-Eastern and Southern regions by 1872, and this percentage increased during the first decades of the twentieth century due to the expansion of the south (Bértola et al. 2007: 3).[20] Data aggregation for 1872 results in a population of around 4 million (with a total

[18] In Lobo (1978) wages are presented as yearly averages. For the estimation, she uses wage rates per hour (8 hours per day, 200 hours per month). In this paper, yearly averages have been multiplied by 12 (months) in order to obtain wages per year and make them comparable to the yearly income information presented by other sources.

[19] Slave income estimations provided by Willebald are set according to the cost of feeding slaves in mining companies, plus a similar amount that covered clothing and housing expenses. Estimations for landowners' income are based on data kindly provided by Willebald and Monasterio.

[20] It should be noted that the reality in the North was quite different to the South-East. For example, in terms of the IPF (described in Section 2), it could be suggested that by the end of the period the North region was most likely characterized by values of income and inequality close to those shown in the late-nineteenth century.

population of 9.6 million), distributed across 36 different professional categories.[21] Moreover, the 1872 census includes information on of the active population gender (male or female) and the labour condition (slave or free). In this case, female income has been estimated as 60 per cent of the male one (either slaves or free).[22] Moreover, it is important to stress that while in Brazil the end of slavery came with the "Lei Áurea" of 1888, the status of past slaves did not change directly (Owensby, 1999: 41) and neither did their mean income and hence the 1872 census includes slave records until 1898.[23]

Next, from 1899 to 1930, the mean income time series has been constructed using the same income resources as in the previous period, but it has been assigned to a fixed structure of the active population according to the 1920 census. In 1920, the demographic census also offers information on gender. However, this census does not provide aggregate data at the country level, nor at the state level, but disaggregated information by municipalities. Due to the large number of municipalities (1,304 in the entire country and 430 in the South-East region) a selection of the sample has been chosen.[24] The data aggregation is carried out on a sample of an active population with 7.8 million individuals (of a total population of 27 million) also distributed across 36 different professions.

Additionally, in order to take into account wage differences throughout the country, I have considered differences between rural and urban areas. Here Lobo (1978)

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[21] From the total observations only 2,268,208 could be considered as "active". The other 1,737,593 observations belong to the "without a profession" category. Nevertheless, since these people could be working in the informal market, average income estimations (based on low income professional categories such as hairdressing and caretaking) have also been assigned to this group.

[22] Estimations based on the wages differential between male and female have been calculated from the DGE (1926).

[23] There is evidence that once the free labor system was established, "darker skinned people tended disproportionately to work at manual jobs [whereas] the white or near-white men […] benefited from racial cleavages and assumptions in hiring, promotion, housing, patronage, social contracts and education" (Owensby, 1999: 41).

[24] The choice has been to take the most populated municipalities (183 of 430) belonging to the States of the South-Eastern region: Minas Gerais (68 of 178), São Paulo (37 of 48) and Rio de Janeiro (78 of 204).

provides nominal urban wages and I have estimated the rural nominal salaries for the 36 professional categories and the proportion of population (by profession) in rural and urban areas. For this purpose, I have employed Klein (1995: 538, Tab.7) and Nunes' (2003: 334, Tab.13) works and Monasterio's data.[25] These sources provide information on the income declared in the electoral rolls, including voters' profession and their area of residence (distinguishing between urban and rural parishes). With this information I have estimated the differences between urban and rural wages (by profession) and the proportion of people (also by profession) residing in one area or another. Therefore, nominal wages were deflated until 1930 by the consumer price index provided by Lobo (1978: 95-99, Tab.4.43).[26]

For the years 1940 and 1950, both the active population (by profession) and the linked mean income by professional category come from the censuses (DGE 1950, 1956) and from the IBGE (1990). The information has been compiled at country level. It comprises an active population with 15 million individuals (of a total population of 41 million) in 1940, and with 25 million individuals (of a total population of 51 million) in 1950, distributed across 22 professional categories. As in the previous period, nominal salaries have been deflated, using the price index provided by Onody (1960: 118) liaised to the Lobo's ones.[27]

[25] Klein (1995) and Nunes (2003) provide information for São Paulo, while Monasterio does for Rio Grande do Sul. The estimations obtained for São Paulo and Rio Grande do Sul have been compared with those obtained for the city of Rio de Janeiro, provided by the DGE (1895). Results are very similar, so it seems possible to use the same estimations along the South-Eastern region.

[26] This index is introduced in Lobo (1978). It is based on the consumption basket elaborated by Affonseca (1920) in 1919. This basket reported middle-high class consumption habits (for example, the food weighs were attributed according their importance on the basket of a middle-high class family). For the years 1940 and 1950, I used Goldsmith's (1986) price index estimations, which have been liaised to the Lobo's series.

[27] For the data see Goldsmith (1986, p. 161).

Therefore, the resulting social table for the period 1839-1950, offering information on the number of people in a particular profession (by gender, condition, and area) and the real income associated to each of those occupation, has been used to explore inequality (Gini index) performance and the middle class (MCI) evolution. Notably, as mentioned in Section 3.2, a particular status has been assigned to the different professional categories appearing on the social table, in order to also explore the evolution of the middle class in terms of status.

5. Brazil (1839-1950): Middle Class evolution in terms of income

Figure 7 shows the evolution of the MCI in terms of income, which, until the late 1870s, exhibits smooth trends, suggesting the lack of a significant middle class. This is not surprising as there is evidence that throughout this period the recently independent Brazilian Empire was essentially a rural economy based on slave labour. Thus, it had a strongly hierarchical and stratified social structure, in which wage labour remained the exception to the rule and the population of independent small farmers and slaves did not offset the power of big landowners (Leff, 1982: 17; Mendoça, 1950: 83-4; Owensby, 1999: 15-16). Moreover, there is evidence that important structural shifts in the Brazilian economy did not occur until the end of the nineteenth century (Leff, 1982: 166), particularly, after the abolition of slavery and the arrival of new immigrants.[28] Thus, short-lived increases of the MCI (1843-1848; 1853-1856) might be the result of the sparse amelioration of salaries for scarce skilled professionals in a context of increasing

[28] Around 3.2 million immigrants, mainly from Southern-Europe, arrived to Brazil after the liberation of near 1 million slaves in 1888 (Goldsmith, 1986: 136)

demand for skilled labour (Lobo, 1978: 128), instead of the result of deep changes in the social structure, still far from presenting social mobility.

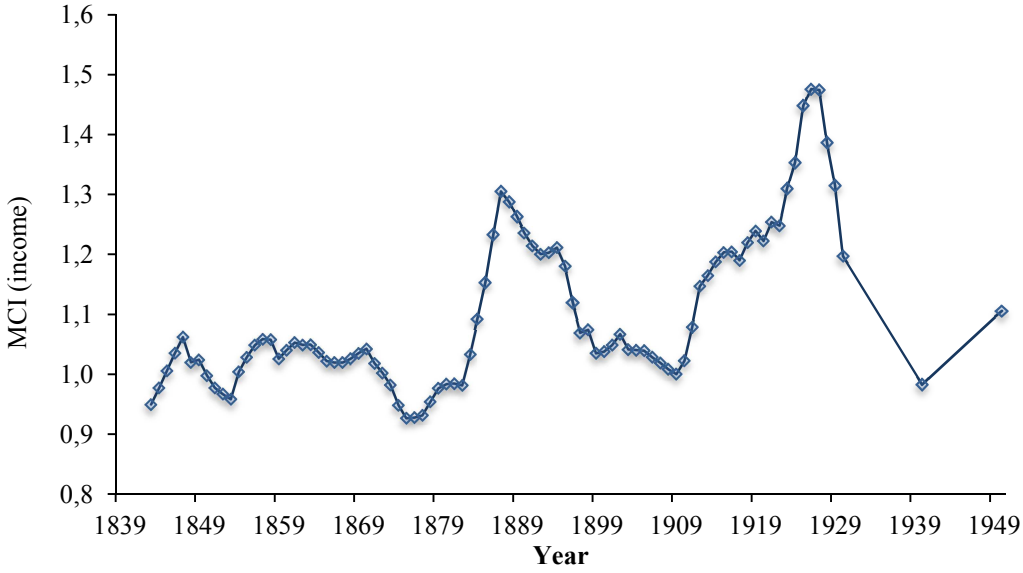

Figure 7. Brazil 1839-1950: Middle Class index (according to income), 5-year end-centred moving averages
Sources: From 1839 to 1930 based on Bértola et al., (2007), Monasterio (n.d), DGE (1872, 1926) and Lobo (1978: 803-20); for 1940 and 1950 sources are IBGE (1990) and DGE (1950, 1956).

A more promising outlook for the middle class emergence came, however, between the mid-1870s and the late-1880s, when the MCI shows a sharp increase. This occurred in a context in which the slavery system had started its decline and free labour and European immigration started to be fostered, implying that salaried work became the rule rather than the exception (Leff, 1982: 52-3; Iglesias, 1994: 12; Sánchez Alonso, 2007: 406).[29] Moreover, these events had important consequences on the social structure. For example, the end of slavery was followed by the recession and the coffee production crisis, that opened a gap in the traditional system of domination (in which the agrarian elite governed) and permitted other groups to temporarily rise and gain some power over

[29] Although the abolition of slavery was not effective until the establishment of the "Lei Áurea" (in 1888), the decline of slavery had started before: first with the prohibition of the slavery trade (in 1850) and then with the "Lei do Ventre Livre" (in 1871), which gave freedom to the newborns of current slaves (Klein & Luna, 2010: 295-296; Reis, 1974: 1).

the traditional oligarchy (Lobo, 1978: 454-55; Iglesias, 1994: 27). These groups were mainly formed by a small urban bourgeoisie linked to commerce, which emerged under the figures of handicraft agents (involved in the commercialisation of the internal production) or traders (whether of imports, securities or money) (Fernandes, 1978: 26).[30] This recomposition of the power structure marked the beginning of modernity and separated the stately era from a society of classes. Thus, in this period, the increase of the MCI witnessed some structural social change, suggesting that the seeds for the middle class emergence started to be sowed:

> "At the end of the Empire of Brazil [1889], there already existed a middle class with clean lines. The social distance between the diverse elements of our people was definitely extinct. The jump from one class to another, from one group to another, was a common spectacle" (Sodré, 1944: 328).

Yet, the MCI decrease during the early years of the First Republic suggests that this middle class in terms of income was not consolidated; on the contrary, it weakened. It fell during the Marshall government first under the administration of Deodoro da Fonseca (1889-1891) and then of Floriano Peixoto (1891-1894). Yet, the fall became much more profound after the election of the first civil president, Prudente de Morais, as this meant the return of the coffee oligarchies to power (Iglesias, 1994: 30; Fausto, 1995: 442; Mota & Lopez, 2009) and the implementation of policies designed to protect the coffee sector to the detriment of emergening industry. [31] The credit diverted to the coffee

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[30] Yet, according to Fernandes (1978: 201): "What many authors denominated the crisis of the oligarchy system was not a collapse […], but the beginning of a transition which inaugurated, still under the hegemony of the oligarchy, the recomposition of the power structures, from which will shape the bourgeois power and the bourgeoisie domination.

[31] These traditional oligarchies linked to the agricultural sector kept power under a patronage system, in which local oligarchs (coronéis) gave favors in return for votes. Under this period (1891-1930), known as *coronelismo*, "contested presidential elections were the exception; landowners had a free hand in their constituencies through control of the police and the judicial system; they rigged election as required, local political leaders automatically supported official candidates. A pact among provincial governors

sector and the deflationary policies benefiting imports and a shrinking internal market negatively affected industry, as well as employment and wages in the secondary sector (Lobo, et al., 1971: 249; Lobo, 1978: 487; Dean, 1992: 338-39). Therefore, the crisis of industry together with the general lack of financing (with the exception of the coffee sector) might have frustrated the expectations of improvement of those susceptible to become middle class in terms of income. For example, by 1908 in Rio de Janeiro salaries of weavers were reduced from 1$300-2$000 per day to 600-1$000, while housing rents ranged from 8$000 to 30$000, representing the lower rent of 44 per cent of the minimum salary and the higher rent of 50 per cent of the maximum salary (Lobo, et al., 1971: 256).[32]

However, a long run increasing trend in the MCI began in 1910 and lasted until the 1930s, reporting a fast recovering of the middle class in terms of income. During this period, despite the political prominence of the supporters of the export economy (particularly, the interests of coffee growers), there were some initiatives favorable to industry (Dean, 1992: 362). In particular, industry benefited from better access to credit, inflation, and a favorable customs policy (which restricted the arrival of competitive goods but allowed machinery imports), as well as the expansion of transportation systems, innovation, and the growing population accompanied by expansion of effective demand (Lobo, 1978: 471; Leff, 1982: 166-87; Wolfe, 1993: 7). Indeed, from this period onwards, the interests of those in the industrial sector went hand in hand with those in the coffee export sector (Dean, 1992: 362; Fausto, 1995: 428; Luna & Klein, 2014: 74). Leff (1969: 479) argued that: "far from being 'alternative' patterns of development, as has

implemented this arrangement. It […] guaranteed the political hegemony of São Paulo [coffee producers] and Minas Gerais [ranchers], the two big states in the southeast." (Abreu & Verner, 1997: 19).

[32] 1$000 stands for 1 mil-réis (official currency in Brazil until 1941).

some-times been suggested, export expansion and industrial development were complementary and mutually supporting". Therefore, boom exports in this period favoured the development of industry (Leff, 1969: 479; Dean, 1992: 363; Baer, 2008: 27). During the first two decades of the twentieth century the sterling value of Brazilian exports had been increasing at an annual trend of 4.2 per cent, meanwhile between 1924 and 1930 the rate of industrial growth was 6 per cent (Leff, 1969: 484-7).

This development of industry, in turn, had a profound impact on the social structure with the creation of new professions (Furtado, 1965: 14; Wolfe, 1993: 6-7). It is important to stress that the progress in the industrial sector increased the demand for skilled workers in metalwork, clothing, shoe, and processed food industries. For instance: "In Rio white-collar employees and professionals made up 20 to 30 percent of the half-million strong work force in 1920. São Paulo's white-collar sector […] neared 20 per cent of the work force" (Owensby, 1999: 29). Moreover, the increasing urbanisation and modernisation also fuelled new professional opportunities in the services and commerce sector (Furtado, 1965: 18-19; Mota & Lopez, 2009: 427; Owensby, 1999: 49). For example, in Rio de Janeiro "in 1919, only 38.4% of its active population was involved in the real physical output, while 61.6% was engaged in the production of services" (Fausto, 1995: 438). Thus, throughout these two decades, the increasing middle class along with increasing inequality might be associated with an early phase of development in a Kuznetsian sense; that is, the result of a transition from the traditional sector to the industrial one and the subsequent rise in wage differences. Importantly, in such a scenario, increasing inequality linked to productivity differences did not impede but rather fostered the rise of a middle class.

Yet, during this period there were also the risk of deterioration of the purchasing power of middle and low income groups because of the fast increase in prices. Between

1914 and 1918 the cost of living tripled, affecting mainly the middle class, as its members had wider budgets than the working class but not very different earnings (Owensby, 1999: 101-117). According to Owensby in 1920, the real wage of those at the 50th percentile was 5.7 Cruzeiros (Cr$), while of those at the 20th and 10th were 5Cr$ and 3.8Cr$, respectively.[33] However, this deterioration was not unchallenged: salaried workers and those working in liberal professions started to associate together and to undertake strikes and protests demanding the raising of salaries and the improvement of labour conditions (Levine, 1998: 38; Paula & Monte-Mór, 2004: 11-2). These strikes succeeded and general real wages slightly rose (Lobo, 1978: 507; Wolfe, 1993: 22), experiencing on average an annual increase of 1.7 per cent between 1919 and 1929 (Goldsmith, 1986: 160). Consequently, it is not surprising that from 1920 to 1930 the middle class in terms of income increased.

The consolidation of this new social middle, however, was completely frustrated during the following years (1930-1950), demonstrated by the abrupt fall of the MCI. This happened in a context of industrial expansion, modernisation and growth (Goldsmith, 1986: 143; Maddison, 1992: 26), but also in a context in which the income of the higher class (now integrated by a new industrial bourgeoisie, but whose interests were linked to those of the old oligarchy) was dramatically distancing itself from the rest:

> "With the stimulus and protection of industry, the bourgeoisie felt safe and became even wealthier. Not just the industrial bourgeoisie, but also the landowners, the commercial and the financial ones. Labour legislation, rather than negatively affecting the bourgeoisie, helped it to grow and consolidate" (Iglesias, 1994: 91-2).

[33] 1 Cr$ amounted to 1 mil-réis.

This was because during this period, under the Vargas' regime (referred to as Estado Novo), economic policies were focused on industrial expansion and social peace. To address the first, Estado Novo's industrial relation system protected industrialists' efforts to maintain low wages, while industrial workers had no power to bargain for higher wages and protect them, so they experienced a steady decline in real income (Wolfe, 1993: 89-90). For instance, in São Paulo, between 1940 and 1945, all factory workers experienced a decrease in their real income of around 33 per cent (Wolfe, 1993: 102, Tab.4.2). Social order, in turn, was maintained by means of repression and welfare programs through co-opted unions which concentrated around social services (Skidmore, 1967: 40; Chacón, 1977: 56; Wolfe, 1993: 100).

Meanwhile, the heterogeneous middle class felt divided between joining worker protests or backing the interests of powerful entrepreneurs (Fausto, 1989: 84-9), politically abandoned and without any bargaining power (Owensby, 1999: 185-202). For instance, in São Paulo, when there were wage increases the increase of those of skilled workers was rather modest (about 11 per cent) in comparison to those of unskilled workers (about 38 per cent), as industrialists counted on the authoritarian Estado Novo's industrial relations to bargaining power of the highly skilled (Wolfe, 1993: 102). In addition to modest nominal wages increases, the recurrent inflation increased of the cost of living, especially during the World War II (Goldsmith, 1986: 158, Tab.IV-7) with dramatic consequences on the middle class' real income.

Therefore, during this period, increasing inequality might be explained in terms of the Lewis (1954) model, in which the elastic supply of labour (in a context of population growth and internal migration) facilitated the capital sector to keep low wages. Crucially, in such a context, despite the industrialization process, the continued increase of inequality had devastating consequences for the middle class.

6. Brazil (1839-1950): Middle class evolution in terms of status

Although the income dimension is important to define the middle class, as mentioned in Section 3, there are other subjective dimensions that characterised the middle class. In particular, in Brazil during the nineteenth and twentieth centuries, status and appearance identified people with a particular social group more than their income did. Noteworthy, one of the main elements that conformed people to a particular class or status was their profession. [34] "Class was a such powerful determinant of position that the attributes of class would often influence the definition of color [...] Black lawyers were often defined as mulattoes, just as mulattoes ones were defined as white" (Klein & Luna, 2010: 268). Indeed, the middle class was so concerned about keeping its status, that they might prefer a low paid non-manual job than any better remunerated work in the manual sector: "[it] was likely less a conscious effort by middle-class people to imitate the rich than an imperative not to be confused with the working-class poor" (Owensby, 1999: 106). Therefore, Figure 8 shows the MCI performance in terms of status linked to the professional category.

[34] Other characteristic elements of the Brazilian middle class, at that time, were expenditures on: clothing, servants, culture and education. (Owensby 1999:107-10).

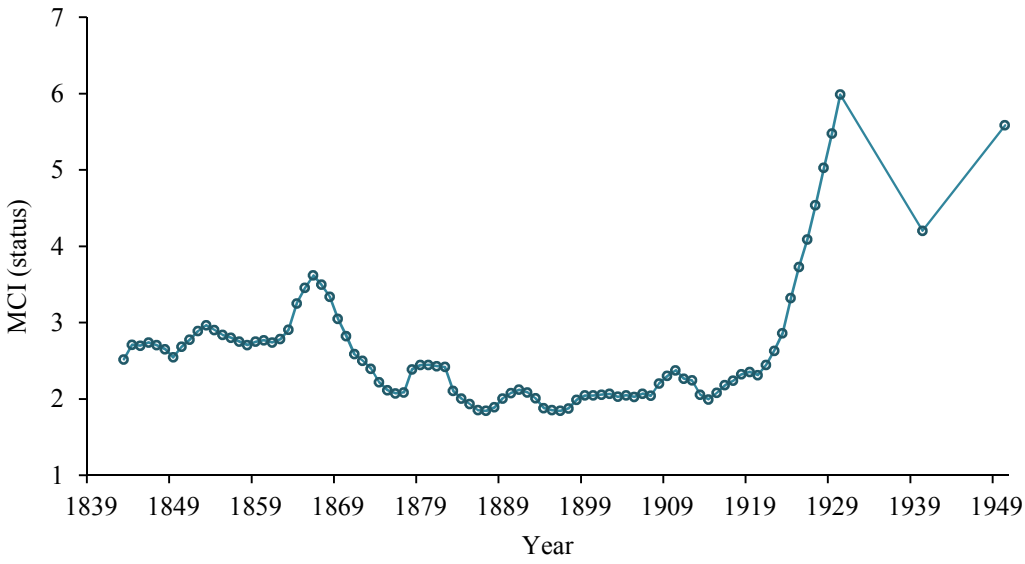

Figure 8. Brazil 1839-1950: Middle Class index (according to status) 5- year moving averages.
Sources: From 1839 to 1930 based on Bértola et al., (2007), Monasterio (n.d), DGE (1872, 1926) and Lobo (1978: 803-20); for 1940 and 1950 sources are IBGE (1990) and DGE (1950, 1956).

It suggests that the emergence of the middle class in terms of status remained unfeasible until the early twentieth century, as the MCI remained stagnant or declining until then. The exception took place between the 1850s and mid-1860s, when we observe a brief increase. This increase might have been linked to the expansion of manufacturing activity and the temporal rise in the demand of skilled labour. For instance, there is evidence that on the eve of the Paraguayan War there was increasing demand in skilled carpenters for the construction of fleets (Lobo et al., 1973: 156). Meanwhile during those years there was increasing investment in new industrial undertakings, shipping and urban transport companies (Jaguaribe, 1968: 133). In this vein, according to Sodré (1939: 71) there is evidence that after the prohibition of slave trade in 1850 public works contracts required the exclusion of slaves, exemplified by the works of the Union and Industry Highway, which mostly hired German and Portuguese workers.[35] Notably, since the rise

[35] The Union and Industry Highway (Estrada de Rodagem União e Indústria) was the road that connected the cities of Petrópolis and Juiz de Fora in the South-East of Brazil.

of the MCI in terms of status seems due to a temporal rise in the demand for skilled professionals, this did not mean any transformation of the social structure.

Indeed, in **Figure 9** can be observed that the increase in the middle class in terms of income during the nineteenth century went along with the immobility of the middle class in terms of status. This suggests that temporal increases in mean income were not translated into real upwards movements in the social scale, denoting a highly stratified society.

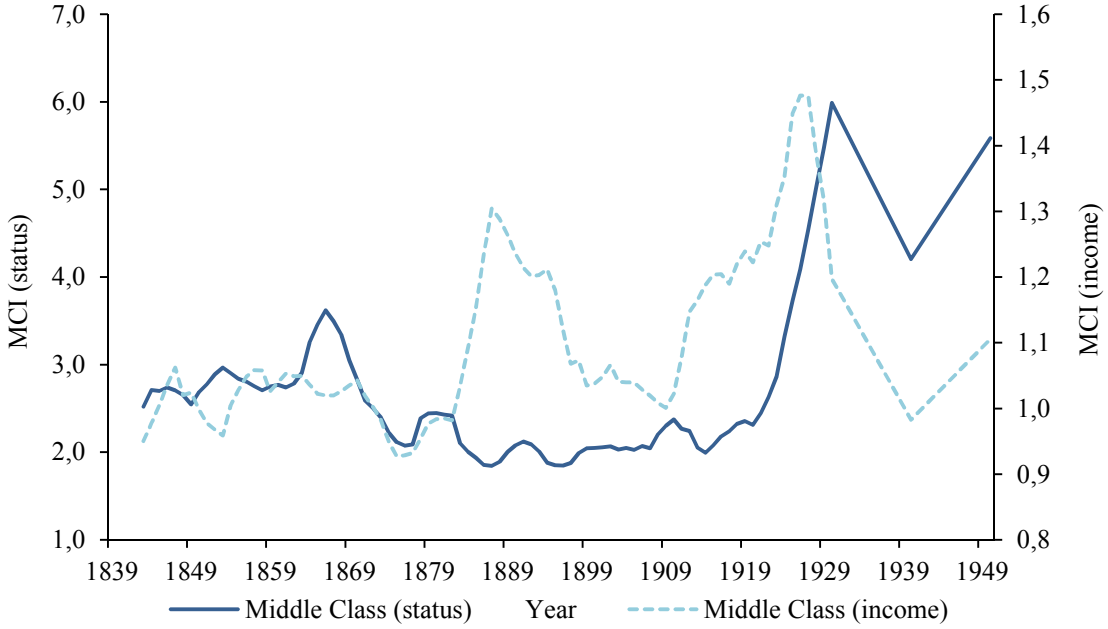

Figure 9. Brazil 1839-1950: Middle Class index (according to status and income) 5- year moving averages.
Sources: From 1839 to 1930 based on Bértola et al., (2007), Monasterio (n.d), DGE (1872, 1926) and Lobo (1978: 803-20); for 1940 and 1950 sources are IBGE (1990) and DGE (1950, 1956).

Nevertheless, from the early 1910s, in a context of increasing modernisation and urbanisation, as happened in terms of income, the middle class in terms of status grew vigorously until the 1930s. During those years, once the work force seems to have been industrialized, industry, non-manual sectors expanded and the demand for professional qualifications and higher education grew in direct proportion to the expansion of these non-manual sectors (Owensby, 1999: 29-30), so did the number of people employed in

liberal professions, administration officer's corps and commerce (Furtado, 1965: 15; Owensby, 1999: 28). Indeed, according to Owensby (1999: 29) this process "had the effect of putting greater social distance between respectable employees and deskilled laborers". In this sense, those who felt part of the middle class in terms of status (for example, white-collar salary earners, commercial employees and clerks) became the most vulnerable to economic crisis and inflation, as they had to struggle to keep up appearances with wider budgets, when prices of clothing and rent (typically demanded by middle class consumers) increased more than, for example, food prices (Goldsmith 1986: 160).

Moreover, the prestige of having a non-manual profession acted as an incentive to choose, if possible, those jobs of higher status even though they were worse paid. Indeed, some manual work was better remunerated than non-manual work, but the middle class preferred to perform non-manual activities (Owensby, 1999: 54). This implies that, contrary to what happened in the nineteenth century, when the increased middle class in terms of income did not lead to a middle class emergence in terms of status, during the early twentieth century, the rise of the middle class in terms of status became more evident than it did in terms of income. Probably, for the same reason the decline of the middle class in terms of status took place later and to a lesser degree than in terms of income.

Yet the fall of the MCI, between 1930 and 1950, also shows evidence of the damage of the middle class during the Vargas era in terms of status. Under the Estado Novo, the government handed out favours to interest groups while giving prerogatives to industrial workers (such as minimum wages, eight-hour day, holidays with pay, job security and a social security system) with a view to maintain populist support from labour groups (Maddison 1992: 21). Meanwhile, those in the middle were dropped by the

wayside, getting weaker and struggling to keep their social status, which, apparently most of them lost. According to my estimations the middle class in terms of status passed from being 26 per cent of the active population in 1930 to 16 per cent in 1950, meanwhile those in the lower class increased from 73 per cent to 82 per cent over the same period. It is worth noting that this weakening of the middle class occurred in a context of modernisation and economic growth, however, accompanied by increasing inequality, social repression and populist policies. Consequently, the middle class' prospects for consolidation became unfeasible.

In sum, we cannot ignore that substantial social structural change occurred in Brazil over the period under review. The decline of slavery (starting in the 1850s), the reduction of inequality (during the late nineteenth century), and the process of modernisation and urbanisation (from the early twentieth century) seems to have been crucial for the emergence of the middle class. However, from the 1930s the continuous increase in inequality, along with a low social cohesion, could have impeded the consolidation of a middle class. On the one hand, social issues were considered by governments as dangers that needed be repressed; on the other hand, the urban population did not yet have the self-awareness or class consciousness necessary to give coherence to its complaints (Furtado, 1965: 19). This, in turn, might have facilitated the emergence of a populist government, which focused on the elite's interests and satisfied immediate population aspirations with welfare programs, but which did not pay too much attention to the medium stratums. Consequently, during the following years, until 1950, the consolidation of the middle class appears to have been frustrated

7. Concluding remarks

As in the most recent decades, Brazil experienced episodes of rapid economic growth between the mid-nineteenth and mid-twentieth centuries (recording periods of per head GDP growth of 2 and 3 per cent annually). However, unlike recent times, there is little evidence on the rise of the middle class during that period and its connection with inequality.

After highlighting the inconsistency of nineteenth century Gini estimates and the underlying ambiguity on the timing of the emergence of the middle class, this article explored Brazil's income distribution between 1839 and 1950 from two perspectives: inequality and polarisation. The article showed that Brazil exhibited low inequality from 1839 until 1913, probably due to low income levels, which impeded the emergence of the middle class. Then inequality started to grow from 1913 onwards, apparently linked to an early phase of economic growth in a Kuznetsian sense, in which the middle class arose. However, between 1930 and 1950 the increase in inequality might be explained in terms of the Lewis (1954) elasticities model, in which the elastic supply of labour in a context of growing population maintained wages at subsistence level blocking the consolidation of the middle class.

In the light of these results, the MCI shows that the seeds for the efflorescence of the middle class were sowed in the late nineteenth century when the decline of the slave system led to a more competitive social order. Yet, its emergence, in terms of both income and status, should be placed during the three first decades of the twentieth century, in a context of expansion of industry and modernisation. Interestingly, from the 1930 until the end of the Vargas era, still in a context of urbanisation and growth, increasing inequality and social repression led the middle class to shrink, both in terms of

income and status. Importantly, results suggesting that persistent inequality, despite economic growth, blocks the consolidation of the middle class and the eradication of poverty, might entail relevant social policy implications for Brazil nowadays and other emerging middle income countries. Yet, broad conclusions would require further investigation on the connection between growth, inequality and the consolidation of the middle class at both country and cross-national levels.

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Appendix

Table 1. HISCLASS classification and group aggregation.

Class number	Class label	Skill level	Manual/ Non manual	3 Groups aggregation	2 Groups aggregation
1	Higher managers	HIGH		HIGH CLASS	
2	Higher profesionals	[1, 2]		[1, 2]	HIGH CLASS
			NON MANUAL		[1, 2, 3, 4, 5]
3	Lower managers	MEDIUM	[1, 2, 3, 4, 5]		
4	Lower proffesionals and clerical and sales personel	[3, 4]			
				MIDDLE CLASS	
5	Lower clerical and sales personel	LOW		[3, 4, 5, 6, 7]	
		[5]			
6	Foremen				
7	Medium skilled workers	MEDIUM			
8	Farmers and fishermen	[6, 7, 8]			LOW CLASS
					[6, 7, 8, 9, 10, 11, 12]
9	Lower skilled workers	LOW	MANUAL	LOW CLASS	
10	Lower skilled farm workers	[9, 10]	[6, 7, 8, 9, 10, 11, 12,]	[8, 9, 10, 11, 12]	
11	Unskilled workers	UNSKILLED			
12	Unskilled farm workers	[11, 12]			

Sources: Based on the classification table in Van Leeuwen, M. and I. Maas (2011)

Table 2. Brazil 1839-1898: sources and data

POPULATION DATA	INCOME DATA
Profession classification acording to 1872 census	**Estimations:**
Artistas (artist)	Based on Lobo (1978), Bértola, L. et al. (2007) and Monasterio (n.d.)*
Advogados (lawyer)	
Canteiros, Calceteiros e Mineiros (stone cutter, platelayer, miner)	
Capitalistas e Proprietários (landowner, proprietary)	
Cirurgiões (doctor surgeon)	
Costureiras (dressmaker)	
Criados e Jornaleiros (house servant and journeyman)	
Escravos (slave)	
Juízes (judge)	
Oficiais de Justiça (judicial solicitor)	
Op. Em Edificações (construction worker)	
Op. Em Metais (blacksmith)	
Procuradores (procurator)	
Serviço Doméstico (domestic servant)	
Sem Profissão (without any profession)	
Capelão (priest)	Based on Lobo (1978)**
Administraçao pública (Government administrators)	
Comerciantes, Guarda-Livros e Caixeiros (retailer, book-keeper, cashier)	
Enfermeiros (nurse)	
Farmacêuticos (chemist)	
Lavradores (farmer)	
Médicos (doctor)	
Operários em Madeiras (wood treaters)	
Professores e Homens de Letras (teacher and first letters teacher)	
Sacristão (sexton)	
Criadores (stock-breeder)	Equal to horticulturit's wage in Lobo (1978)***
Notários e Escrivães (notary)	Equal to lawyer's wage
Op. De Calçado (shoemaker)	Equal to 89% carpenter's wage in Lobo (1978)***
Op. De Chapéus (hat maker)	Equal to 89% carpenter's wage in Lobo (1978)***
Op. De Vestuários (dressmaker)	Equal to 89% carpenter's wage in Lobo (1978)***
Op. Em Couros e Peles (leather goods maker)	Estimated as 87% carpenter's wage in Lobo (1978)***
Op. Em tecidos (weaver)	Estimated as 60% carpenter's wage in Lobo (1978)***
Op. Em Tinturaria (dyer worker)	Equal to carpenter's wage in Lobo (1978)***
Parteiros (midwife)	Equal to nurse's wage in Lobo (1978)

Notes: English translations of professions are based on HISCO database.
* Bértola's et al.,(2007) estimations are mostly based on Lobo (1978).
** Lobo's estimations have been adjusted according to those reported by other authors for specific periods: Klein (1995) provides data for 1880; Nunes (2003) from 1870 to 1889; Monasterio for 1880 and 1881; and chosen Lobo's sample for adjustment is from 1879 to 1881.
*** Equivalences are based on information of industrial salaries from IBGE (1990).

Table 3. Brazil 1899-1930: sources and data

POPULATION DATA	INCOME DATA
(profession classification acording to 1920 census)	**Estimations from:**
Advogados (lawyer)	Based on Lobo (1978), Bértola, L. et al. (2007) and Monasterio (n.d.)*
Canteiros, Calceteiros e Mineiros (stone cutter, platelayer, miner)	
Capitalistas e Proprietários (landowner, proprietary)	
Cirurgiões (doctor surgeon)	
Costureiras (dressmaker)	
Criados e Jornaleiros (house servant and journeyman)	
Juízes (judge)	
Oficiais de Justiça (judicial solicitor)	
Op. Em Edificações (construction worker)	
Serviço Doméstico (domestic servant)	
Sem Profissão (without any profession)	
Administraçao pública (Government administrator)	Based on Lobo (1978)**
Capelão (priest)	
Comerciantes, Guarda-Livros e Caixeiros (retailer, book-keeper, cashier)	
Enfermeiros (nurse)	
Farmacêuticos (chemist)	
Lavradores (farmer)	
Médicos (doctor)	
Operários em Madeiras (wood treaters)	
Sacristão (sexton)	
Criadores (stock-breeder)	Equal to horticulturit's wage in Lobo (1978)
Notários e Escrivães (notary)	Equal to lawyer's wage
Op. De alimentação (food and beverage processors)	Equal to press worker's wage in Lobo (1978)***
Op. De apparelhos de transporte (transport equipment operator)	Equal to machine worker's wage in Lobo (1978)***
Op. De cerámica (potter)	Estimated as 87% carpernter's wage in Lobo (1978)***
Op. De mobiliario (bench carpenter)	Equal to carpenter's wage in Lobo (1978)***
Op. De producçao e transmissao de forças fhisicas (stationary engine operato	Equal to machine worker's wage in Lobo (1978)***
Op. De Vestuários (dressmaker)	Estimated as 89% carpenter's wage in Lobo (1978)***
Op. Em Couros e Peles (leather goods maker)	Estimated as 87% carpernter's wage in Lobo (1978)***
Op. Em Metais (blacksmith)	Estimated as 96% carpernter's wage in Lobo (1978)***
Op. Em tecidos (weaver)	Estimated as 60% carpernter's wage in Lobo (1978)***
Op. Relat. Ás sciencias, lettras e artes (artists)	Equal to carpenter's wage in Lobo (1978)***
Parteiros (midwife)	Equal to nurse's wage in Lobo (1978)
Procuradores (procurator)	Equal to lawyer's wage in Lobo (1978)

Notes: English translations of professions are based on HISCO database.
* Bértola's et al.,(2007) estimations are mostly based on E. Lobo (1978).
** Lobo's estimations have been adjusted according to those reported by other authors for specific periods: Klein (1995) provides data for 1880; Nunes (2003) from 1870 to 1889; Monasterio for 1880 and 1881; and chosen Lobo's sample for adjustment is from 1879 to 1881.
*** Equivalences are based on information of industrial salaries from (IBGE)1990

Table 4. Brazil 1940, 1950: sources and data.

POPULATION DATA	INCOME DATA
(profession classification acording to 1940 and 1950 censuses	**Estimations from:**
Agricultura (Farmers) Capitalistas e Proprietários (Landowners, proprietors)* Criaçao (Livetock Farmer)	Agricultural censuses 1940 and 1950
Capitalistas e Proprietários (Owners, propietors)* Extacçao de mat.mineraes (Stone cutters, platelayers, miners) Industria de transformaçao (Procesing industry workers) Produçao e alimentos, bebidas, etc (Food and beverage processors) Texteis, vestuario,caçados, etc (Weavers, dressmakers, shoe makers etc) Metalurgia, material de transporte, etc (Blacksmiths, toolmakers, machine-tool operators) Química, derivados de petroleo (Workers with chemical and related processes) Outras industrias (Bricklayers, stonemansons, potters)	Industrial censuses 1940 and 1950
Transportes y comunicaçoes (Transports)	Transport censuses 1940 and 1950
Alimentos, bebidas, comercio ambulante, etc (Salesperson, wholesale or retail trade) Bancos e outras actividades financeiras (Bank tellers, finance clerks, insurance salesman) Comercio Productos agrícolas, quimicos, maquinas (Purchasing agent or technical salesman) Outras actividades comerciais (Other sales workers)	Commercial censuses 1940 and 1950
Capitalistas e Proprietários (Owner, propietor)* Serviço de Recreaçao (Leisure services) Servicio doméstico (Domestic servant) Otros serviços pessoais (Hotel and Restaurant) Actividades mal definidas (Badly defined activities)**	Services censuses 1940 and 1950
Serviço governamentais (Government Administrators)***	IBGE (1990)

Notes: English translations of professions are based on HISCO database.

* Agricultural owner rents= land rents+ production value- cost of production / number of establishments of large scale production; Industrial owner rents (assuming one owner by establishment)= Annual rent by establishment (production value+ processing value - consumption- expenses- salaries)/ number of establishments; Services owner rents (assuming one proprietary by establishment) = Annual rent by establishment (revenues from commodity trade - expenses- salaries)/ number of establishments.

**Average of wages on housing and care activities (Doorkeepers, hairdressers, beauticians)

***Government administrator's wage= Government personnel expending/ personnel. Source: IBGE/ Conteúdo Histórico/ Estatísticas do século XX/ Econômicas/ Contas Nacionais/Setor Público/Despesa primaria do Governo / pessoal.

Table 5. Brazil 1839-1950. Inequality (Gini), Polarisation (EGR index with *n*=2 and *n*=3),

Year	Gini	EGR (*n*=2)	EGR (*n*=3)	Year	Gini	EGR (*n*=2)	EGR (*n*=3)
1839	0.27	0.08	0.07	**1886**	0.21	0.06	0.08
1840	0.29	0.09	0.08	**1887**	0.21	0.06	0.07
1841	0.30	0.09	0.08	**1888**	0.22	0.06	0.07
1842	0.30	0.09	0.08	**1889**	0.21	0.06	0.07
1843	0.32	0.09	0.12	**1890**	0.21	0.06	0.07
1844	0.31	0.09	0.09	**1891**	0.22	0.06	0.07
1845	0.29	0.09	0.10	**1892**	0.22	0.06	0.07
1846	0.29	0.09	0.09	**1893**	0.23	0.06	0.07
1847	0.29	0.09	0.10	**1894**	0.22	0.06	0.07
1848	0.29	0.10	0.10	**1895**	0.23	0.06	0.06
1849	0.30	0.10	0.10	**1896**	0.23	0.06	0.06
1850	0.28	0.08	0.08	**1897**	0.24	0.07	0.07
1851	0.26	0.07	0.07	**1898**	0.25	0.06	0.07
1852	0.24	0.07	0.06	**1899**	0.25	0.09	0.09
1853	0.22	0.06	0.06	**1900**	0.23	0.09	0.09
1854	0.22	0.06	0.07	**1901**	0.23	0.09	0.09
1855	0.22	0.06	0.06	**1902**	0.23	0.09	0.09
1856	0.23	0.06	0.06	**1903**	0.22	0.08	0.09
1857	0.23	0.06	0.06	**1904**	0.23	0.09	0.09
1858	0.24	0.07	0.06	**1905**	0.23	0.09	0.09
1859	0.22	0.06	0.06	**1906**	0.24	0.09	0.09
1860	0.22	0.06	0.06	**1907**	0.27	0.11	0.11
1861	0.22	0.06	0.06	**1908**	0.26	0.10	0.10
1862	0.23	0.06	0.06	**1909**	0.24	0.09	0.09
1863	0.26	0.07	0.07	**1910**	0.23	0.08	0.09
1864	0.29	0.08	0.08	**1911**	0.23	0.07	0.09
1865	0.28	0.08	0.08	**1912**	0.24	0.07	0.10
1866	0.27	0.07	0.08	**1913**	0.22	0.07	0.08
1867	0.29	0.08	0.08	**1914**	0.22	0.07	0.08
1868	0.29	0.08	0.08	**1915**	0.22	0.07	0.08
1869	0.29	0.07	0.08	**1916**	0.24	0.07	0.09
1870	0.29	0.07	0.08	**1917**	0.27	0.08	0.10
1871	0.25	0.07	0.07	**1918**	0.29	0.08	0.11
1872	0.26	0.08	0.07	**1919**	0.29	0.09	0.11
1873	0.24	0.07	0.06	**1920**	0.31	0.10	0.11
1874	0.24	0.07	0.06	**1921**	0.28	0.08	0.11
1875	0.25	0.07	0.07	**1922**	0.30	0.09	0.11
1876	0.24	0.06	0.06	**1923**	0.29	0.07	0.12
1877	0.23	0.06	0.06	**1924**	0.28	0.08	0.11
1878	0.23	0.06	0.06	**1925**	0.28	0.07	0.11
1879	0.24	0.06	0.06	**1926**	0.30	0.08	0.12
1880	0.23	0.06	0.06	**1927**	0.31	0.10	0.13
1881	0.24	0.06	0.06	**1928**	0.32	0.11	0.13
1882	0.22	0.06	0.05	**1929**	0.34	0.13	0.13
1883	0.21	0.06	0.07	**1930**	0.35	0.14	0.14
1884	0.21	0.06	0.07	**1940**	0.30	0.12	0.12
1885	0.20	0.06	0.07	**1950**	0.35	0.13	0.14

Table 6. Brazil 1839-1950: Polarisation (ZK index *n*=2 & *n*=3)

Year	ZK (*n*=2)	ZK (*n*=3)	Year	ZK (*n*=2)	ZK (*n*=3)
1839	0.30	0.68	**1886**	0.65	1.11
1840	0.25	0.60	**1887**	0.52	1.02
1841	0.21	0.52	**1888**	0.44	0.94
1842	0.21	0.57	**1889**	0.39	0.91
1843	0.15	0.42	**1890**	0.39	0.86
1844	0.14	0.44	**1891**	0.47	0.92
1845	0.40	0.94	**1892**	0.45	0.82
1846	0.38	1.00	**1893**	0.45	0.76
1847	0.38	0.97	**1894**	0.45	0.77
1848	0.38	0.94	**1895**	0.21	0.43
1849	0.29	0.78	**1896**	0.31	0.60
1850	0.23	0.69	**1897**	0.21	0.41
1851	0.25	0.78	**1898**	0.12	0.27
1852	0.25	0.79	**1899**	0.19	0.39
1853	0.31	0.90	**1900**	0.19	0.39
1854	0.42	1.01	**1901**	0.20	0.39
1855	0.31	0.85	**1902**	0.24	0.47
1856	0.24	0.70	**1903**	0.25	0.53
1857	0.26	0.73	**1904**	0.20	0.41
1858	0.22	0.58	**1905**	0.20	0.40
1859	0.25	0.67	**1906**	0.17	0.36
1860	0.23	0.66	**1907**	0.30	0.56
1861	0.25	0.69	**1908**	0.11	0.32
1862	0.19	0.57	**1909**	0.16	0.43
1863	0.16	0.51	**1910**	0.25	0.59
1864	0.07	0.33	**1911**	0.88	1.44
1865	0.09	0.33	**1912**	0.85	1.48
1866	0.09	0.34	**1913**	0.67	1.31
1867	0.13	0.33	**1914**	0.47	1.08
1868	0.14	0.34	**1915**	0.39	1.08
1869	0.11	0.33	**1916**	0.78	1.67
1870	0.12	0.33	**1917**	1.11	2.27
1871	0.20	0.49	**1918**	1.02	2.43
1872	0.25	0.50	**1919**	0.98	2.41
1873	0.33	0.64	**1920**	1.02	2.62
1874	0.30	0.61	**1921**	0.88	2.47
1875	0.22	0.48	**1922**	0.93	2.75
1876	0.27	0.60	**1923**	0.83	2.94
1877	0.29	0.61	**1924**	0.54	2.58
1878	0.28	0.95	**1925**	0.62	2.86
1879	0.24	0.55	**1926**	0.70	3.23
1880	0.27	0.60	**1927**	0.68	3.53
1881	0.27	0.59	**1928**	0.61	3.65
1882	0.33	0.66	**1929**	0.58	4.04
1883	0.51	0.96	**1930**	0.60	4.28
1884	0.58	1.04	**1940**	0.14	0.59
1885	0.61	1.14	**1950**	0.39	2.20